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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,826	06/26/2007	Thierry Duverger	PSA05002	3979
29980	7590	02/29/2008	EXAMINER	
NICOLAS E. SECKEL Patent Attorney 1250 Connecticut Avenue, NW Suite 700 WASHINGTON, DC 20036			COLEMAN, KEITH A	
			ART UNIT	PAPER NUMBER
			3747	
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			02/29/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/551,826

**Applicant(s)**

DUVERGER ET AL.

**Examiner**

KEITH COLEMAN

**Art Unit**

3747

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SD/US)  
Paper No(s)/Mail Date 6/26/2007
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in view of Dazzi (US Patent No. 4,467,757).

With regards to claims 1 and 2, Clarke et al. discloses a self-igniting gasoline internal combustion engine (10) comprising at least one cylinder (14, Col. 2, Lines 65-70, Figure 1), a cylinder head closing the cylinder (18, Col. 2, Lines 65-70, Figure 1), a piston (34, Col. 3, Lines 10-15) slidably arranged in the cylinder (18), a combustion chamber (44, Col. 3, Lines 30-35) defined in the cylinder (18) between an upper face of the piston (34) and a lower face of the cylinder head (18), **an injector** for injecting gasoline (injector means 186 comprising fuel injector 190, Col. 5, Lines 55-65) into the combustion chamber (44), intake valves (82, Col. 4, Line 30, Figure 1) and exhaust valves (112, Col. 4, Line 49, Figure 1) selectively closing the combustion chamber (44), the ignition of the air-gasoline mixture being obtained spontaneously in at least a range of operation of the engine thanks to thermodynamic conditions in the combustion chamber (44, Col. 3, Lines 35-45). Clarke et al. does not disclose an injection pump intended to supply the injection with pressurized gasoline, characterized in that wherein the pressure of the gasoline provided to the injector is above 250 bars and 500 bars. Dazzi discloses an injection pump (Col. 1, Lines 20-25) intended to supply **the injector** (2, Col. 3, Line 9) with pressurized gasoline (Col. 1, Lines 10-15), characterized in that wherein the pressure of the gasoline provided to the injector is above 250 bars and 500 bars (Col. 4, Lines 48-50). It would have been obvious to a person of ordinary skill in

the art at the time the invention was made to modify the fuel injector of Clarke et al. with a high pressure fuel injector connected to a fuel pump in view of the teaching to Dazzi, in order to inject fuel in a cylinder (Col. 2, Lines 34-35 from Dazzi)

With regards to claim 3, the patent to Clarke et al. discloses wherein injection of the gasoline is made in a time interval situated at the end of the cycle of compression of the load by the cylinder (Col. 3, Lines 35-45).

With regards to claim 5, the patent to Clarke et al. discloses means for supercharging the intake air intended to be supplied to the combustion chamber (Col. 1, Lines 22-25).

With regards to claim 6, the patent to Clarke et al. discloses wherein, at least in a range of operation of the engine (Abstract, Col 1, Lines 45-55), the amount of gasoline delivered to **the injector** (190) for a combustion cycle is fractionated in the form of a plurality of partial and distinct injections (Col. 5, Lines 55-65) except a pump. Dazzi discloses a pump (Col. 1, Lines 20-25).

With regards to claim 8, the patent to Clarke et al. discloses ignition means (Col. 3, Lines 35-45) intended to produce ignition of the air-gasoline mixture in the combustion chamber (44) during the very low load or very high load ranges of operation (Col. 1, Lines 47-55).

With regards to claims 9 and 12, the patent Clarke et al. discloses an engine characterized in that it, which uses a ratio of residual gases above 20%, and preferably above 50% (Col. 4, Lines 9-15). It is noted that all exhaust or residual gases are used to drive the turbines of the turbocharger.

With regards to claim 11, the patent to Clarke et al. discloses an engine characterized in that it, which is of the direct-jet (186, Col. 5, Lines 55-56). It is noted that the fuel injectors (186) from Clarke et al. are interpreted as direct jet.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) as applied to claim 1 above, and further in view of Rouger (US Patent No. 3,741,175).

With regards to claim 10, Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) discloses all the claimed subject matter except a variable compression ratio. Rouger discloses a variable compression ratio. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the engine of Clarke et al. or Dazzi with a variable compression ratio in view of the teaching to Rouger, in order to provide a further increase in scavenging efficiency (Col. 2, Lines 25-30 from Rouger).

6. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) as applied to claim 1 above, and further in view of Stevenson et al. (US Patent No. 4,417,469)

With regards to claim 4, the combination of Clarke et al. and Dazzi discloses all the limitations of the claimed subject matter including Clarke et al. disclosure of injecting gasoline in a time interval. The combination does not further discloses injection of the gasoline is made between 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center. Yamamoto et al. discloses 20 degrees crankshaft before the high dead center of the combustion cycle and 5 degrees crankshaft after the high dead center (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further include 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.). In addition, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further provide the injection of gasoline based on crank angles of either Clarke et al. or Dazzi with a given crank angle range in view of the teaching to Yamamoto et al., in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.).

With regards to claim 7, the patent to Clarke et al. discloses at least one partial injection delivered during the air intake phase into the combustion chamber and during the first part of the compression, and at least one partial injection delivered around the high dead center (Col. 3, Lines 35-45). The combination does not further disclose injection of the gasoline is made between 60 degrees crankshaft before the combustion high dead center and 20 degrees after this combustion high dead center. Yamamoto et al. discloses 20 degrees crankshaft before the high dead center of the combustion cycle and 5 degrees crankshaft after the high dead center (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further include 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.). In addition, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further modify the fuel injections of gasoline based on crank angles of either Clarke et al. or Dazzi with a given crank angle range in view of the teaching to Yamamoto et al., in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.).

### ***Response to Arguments***

Applicant's arguments filed 12/20/2007 have been fully considered but they are not persuasive.

### ***Applicant's Arguments***



Applicant provided the Automotive Handbook published by Bosch (5<sup>th</sup> Edition, 2000). Furthermore, Applicant argues that even though fuel pumps at high pressure of 1000 bar and higher have been commonly known for diesel engines, this was not the case for gasoline engines before the present invention and further argues that it would have been clear to the person of average skill in the art that both Clarke and Dazzi relate to diesel engine and not self-igniting gasoline combustion engines. Lastly states that the references are silent as to gasoline engines.

#### ***Examiner's Response to Arguments***

Applicant alleges that "even though fuel pumps at high pressure of 1000 bar and higher have been commonly known for diesel engines, this was not the case for gasoline engines before the present invention", however, applicant did not bring forth any substantial evidence to support this allegation. The Automotive Handbook is subjective as to what is commonly known to the general public, but not what is patentably distinct over one of ordinary skill in the art at the time the invention was made. However, to remedy the notion that **"fuel pumps at high pressure of 1000 bar and higher have been commonly known for diesel engines"**, the patent to Krampe et al. (US Patent No. 5,960,627) discloses **"800 bars or greater are *usually attained*"** on **Col. 2, Lines 27-30 and supports Examiner's obviousness rejections**. In addition, it should be noted that **no distinction** has been made between **diesel and gasoline engines** since on **Col. 1, Line 14 Krampe et al. explicitly states "diesel gasoline engines"**.

As to the remarks, "it would have been clear to the person of average skill in the art that both Clarke and Dazzi relate to **diesel engine and not self-igniting gasoline combustion engines**", Dazzi clearly states "**Diesel engines, as well as in gasoline engines** of the type with direct injection each combustion chamber is equipped with an injector provided with an injector needle which lifts itself from a seat at the start of each injection and closes itself upon its seat as soon as the injection is terminated." on Col. 1, Lines 11-16 and is **not silent** to gasoline engines. Also, it is deemed from Dazzi that a person of ordinary skill in the art at the time the invention would have found it clear that the injectors disclosed by Dazzi relate to both diesel and gasoline engines. Since applicant has not amended the claims to change the scope of the claimed subject matter and has not brought forth further substantial evidence to support his allegation (See 37 CFR 1.131, 1.130, and 1.132), this action is made final.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH COLEMAN whose telephone number is (571)270-3516. The examiner can normally be reached on 5:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Cronin can be reached on (571)272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAC

/K. C./

Examiner, Art Unit 3747

/Stephen K. Cronin/

Supervisory Patent Examiner, Art Unit 3747

